

REMARKS

The Office Action mailed June 4, 2008, and made final, and the Advisory Action mailed October 8, 2008 have been carefully reviewed and the foregoing amendment and the following remarks have been made in consequence thereof.

Claims 1, 3-6, 8-20, and 22 are pending in this application. Claims 1, 3-6, and 22 stand rejected. Claims 8-20 have been withdrawn from consideration. Claims 2, 7, and 21 have been cancelled.

The rejection of Claims 1 and 3-6 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent 6,438,838 (Meier) in view of U.S. Patent 3,650,635 (Wachtell) or in the alternative as being obvious over Meier in view of U.S. Patent 6,912,446 (Wang) and Wachtell is respectfully traversed.

Meier describes a method for repairing a vane (5) for a turbine. The repair method includes severing and removing a damaged section (4') of vane (5) along a plane (12) such that a stub (13) is formed. During the repair process, an inductor (16) is coupled to a periphery (15) of stub (13) to heat and soften periphery (15). A replacement vane (20) that corresponds in shape and curvature to stub (13) is aligned and welded to stub (13) in a protective gas atmosphere using high-frequency welding. Specifically, when a high-frequency current is applied to inductor (16), the material of stub (13) and replacement vane (20) melts to enable replacement vane (20) and stub (13) to be bonded together. Notably, Meier does not describe nor suggest coupling a replacement blade portion to a remaining blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process.

Wachtell describes a method for repairing damaged or defective turbine guide vanes (21). A substantially-rectangular, longitudinal section of the vane including the defect (not shown) is cut from the vane (21) and removed. A substantially-rectangular, longitudinal insert (23) is welded to the vane (21) using either tungsten inert gas welding or electron beam welding to couple the replacement insert (23) to the remaining vane (21). The insert (23) includes columnar grains that extend along a trailing edge of the vane (21) such that grain boundaries are substantially eliminated normal to the edge of the insert (23). Notably, Wachtell does not describe nor suggest coupling a replacement blade portion to a remaining

blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process.

Claim 1 recites a method of replacing a portion of a gas turbine engine rotor blade, wherein the method comprises:

cutting through the rotor blade such that a cut line extends from a leading edge of the blade to a trailing edge of the blade and between the first sidewall and the second sidewall . . . coupling, with resistance welding, a replacement blade portion to a remaining blade portion at a joint defined by the cut line such that it facilitates coupling using a high yield automated process
....

Applicants respectfully submit that no combination of Meier and Wachtell describes nor suggests a method of replacing a portion of a gas turbine engine rotor blade as is recited in Claim 1. Specifically, no combination of Meier and Wachtell describes nor suggests coupling a replacement blade portion to a remaining blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process. Rather, in contrast to the invention, Meier describes preparing for coupling by arranging an inductor proximate a stub and securing a replacement vane in a two-part cassette, and Wachtell describes coupling an insert to a turbine engine blade with a complex geometry joint defined by a plurality of buttresses.

Regarding the traversal of the alternative rejection, Meier and Wachtell are described above.

Wang describes a method for repairing an airfoil (34). A computer (60) generates a numerically-controlled (NC) tool path for use by an NC machine (62) with a tool holder (64) and cutting tool (68). A plate is welded to the surface of a fan blade (8) with a weld material of the same material as the plate and fan blade (8). The displacement-sensing probe (66) scans the shape of the fan blade (8), including the weld-repaired airfoil portion (34), and sends the data to the computer (60). An NC tool path is then generated to blend the weld-repaired region smoothly with its adjacent surfaces. Notably, Wang does not describe nor suggest coupling with resistance welding a replacement blade portion to a remaining blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process.

Claim 1 is recited above.

Applicants respectfully submit that no combination of Meier, Wachtell, and Wang describes nor suggests a method of replacing a portion of a gas turbine engine rotor blade as is recited in Claim 1. Specifically, no combination of Meier, Wachtell, and Wang describes nor suggests coupling a replacement blade portion to a remaining blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process. Rather, in contrast to the invention, Meier describes arranging an inductor proximate a stub and securing a replacement vane in a two-part cassette, Wachtell describes coupling an insert to a turbine engine blade with a complex geometry joint defined by a plurality of buttresses, and Wang describes coupling a plate to a blade and generating a numerically-controlled tool path to blend the weld-repaired region.

Accordingly, for at least the reasons set forth above, Claim 1 is submitted as patentable over Meier in view of Wachtell and patentable over Meier in view of Wang and Wachtell

Claims 3-6 depend from independent Claim 1. When the recitations of Claims 3-6 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claims 3-6 likewise are patentable over Meier in view of Wachtell and patentable over Meier in view of Wang and Wachtell

For at least the reasons set forth above, Applicants respectfully request that the rejection of Claims 1 and 3-6 under Section 103 be withdrawn.

The rejection of Claim 22 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent 6,438,838 (Meier) in view of U.S. Patent 6,912,446 (Wang) and U.S. Patent 3,650,635 (Wachtell) as applied to Claim 1 and further in view of U.S. Patent 6,238,187 (Dulaney) is respectfully traversed.

Meier, Wang, and Wachtell are described above.

Dulaney describes a method for repairing a damaged airfoil. The repair method includes removing (step 24) damaged portions or sections (12 and 16, for example) of airfoil (10) and replacing (step 26) these portions (12 and 16) with replacement pieces (44 and 46, for example). Replacement pieces (44 and 46) are integrally joined to airfoil (10) using a joining (step 28) operation to form a refurbished airfoil that includes a seam (78) defined between the airfoil (10) and the replacement piece (44 and 46). The refurbished airfoil is

shaped (step 29) by removing the excess material from replacement piece (44 and 46) and seam (78) to return the joined airfoil to predetermined dimensional tolerances. A laser shock peening treatment (step 30) induces the formation of compressive residual stresses at the seam (78). Notably, Dulaney does not describe nor suggest coupling with resistance welding a replacement blade portion to a remaining blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process.

Claim 1 is recited above.

Applicants respectfully submit that no combination of Meier, Wachtell, Wang, and Dulaney describes nor suggests a method of replacing a portion of a gas turbine engine rotor blade as is recited in Claim 1. Specifically, no combination of Meier, Wachtell, Wang, and Dulaney describes nor suggests coupling a replacement blade portion to a remaining blade portion at a joint defined by a cut line such that it facilitates coupling using a high yield automated process. Rather, in contrast to the invention, Meier describes arranging an inductor proximate a stub and securing a replacement vane in a two-part cassette, Wachtell describes coupling an insert to a turbine engine blade with a complex geometry joint defined by a plurality of buttresses, Wang describes coupling a plate to a blade and generating a numerically-controlled tool path to blend the weld-repaired region, and Dulaney describes coupling a replacement piece to an airfoil by positioning the airfoil using a located fixture and securing the joined airfoil in a rigid machine tooling for shaping and laser shock peening.

Moreover, if art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. *U.S. v. Adams*, 148 USPQ 479 (1966); *Gillette Co. v. S.C. Johnson & Son, Inc.*, 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, Applicants respectfully submit that Dulaney, as a whole, is not suggestive of the presently claimed invention. Specifically, column 8, lines 13-16 of Dulaney recites:

Using a single cut may create vibration which could alter the remaining airfoil, such as altering the airfoils dimensional tolerances.

As such, Dulaney does not describe nor suggest “cutting through the rotor blade” as is recited in Claim 1. Accordingly, Applicants respectfully submit that Dulaney, as a whole, teaches away from Claim 1 as recited.

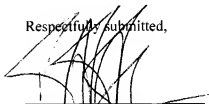
Accordingly, for at least the reasons set forth above, Claim 1 is submitted as patentable over Meier in view of Wachtell and patentable over Meier in view of Wang and Wachtell and further in view of Dulaney

Claim 22 depends from independent Claim 1. When the recitations of Claim 22 are considered in combination with the recitations of Claim 1, Applicants respectfully submit that dependent Claim 22 likewise is patentable over Meier in view of Wang and Wachtell and further in view of Dulaney

For at least the reasons set forth above, Applicants respectfully request that the rejection of Claim 22 under Section 103 be withdrawn.

In view of the foregoing remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,



Robert B. Reeser III
Registration No. 48,548
ARMSTRONG TEASDALE LLP
One Metropolitan Square, Suite 2600
St. Louis, Missouri 63102-2740
(314) 621-5070